What Part of the Varroa Population is removed by creating a Nucleus ?

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Supplementary biotechnical measures are recommended besides the varroa treatment, in order to slow down the build up of the varroa population in spring and thus reduce the infestation pressure. Their advantage is that they can be carried out in the middle of the bee season. The use of acaricides for varroa control, on the other hand, presents a high contamination risk for the honey harvest.
In a previous publication we pointed out that cutting out the capped drone brood reduces impressively the build up of the varroa population (Charrière et al., 1998). The creation of nucleus-colonies is another effective biotechnical method for removing a considerable part of the mite population from the parent colony. The trial described below shows what part of the varroa population can be removed from the parent colony by forming a nucleus colony.

Sequence of Trial

Making nucleus in spring

In the end of May / beginning of June a nucleus was taken from a strong bee colony of an apiary in the Swiss “Mittelland” equipped with Dadant hives which had been treated almost exceptionally with formic acid, so far. Three brood combs (about 30 dm2) mostly sealed and representing about half the sealed brood were taken from the parent colony for the creation of the nucleus together with 6’000-8'000 bees. The colony size was estimated during the division; the corresponding data are listed in table 1. The nucleus-colonies were placed at a distance of 10 km from the parent colonies. The queen in the parent colony was locked up during three weeks while the nucleus colony had to rear a new queen. Three weeks after the division the parent and the new colony both without any sealed brood were treated once with Perizin (50 ml). The dead varroa mites were collected and counted during ten days by means of grid protected bottom boards. The number of dead mites from both the parent colony and its nucleus was assumed to be the whole mite population of the parent colony before the division (100%). Eight bee colonies were included in the trial in 1993, ten in 1994.

Table 1:

		1993	1994
Date of division		**3.6.1993**	**25.5.1994**
Number of parent colonies		**8**	**10**
Average strenghth of parent colonies after the division	**Bees**	**16090**	**11320**
	Brood (dm^2)	**50.0**	**34.6**
Average strenghth of nucleus-colonies	**Bees**	**7900**	**6620**
	Brood (dm^2)	**35.1**	**28.2**

Effects on the Varroa Population

In 1993 and 1994 25% of the varroa mites on average (min. 17%; max. 45%), respectively 35% (min. 21%; max. 78%) could be removed from the parent colony by making a nucleus (figures 1 and 2). However, the reduction of the mite fall by this biotechnical procedure during the autumn treatment could not be determined in this trial. Although the total number of varroa mites is not changed by the creation of a nucleus, it is neverthless divided up on two colonies. After a few weeks the total number of bees is larger than the one of a single colony, because there are now two queens laying eggs. Accordingly, the number of affected bees is reduced.

What is the significance of the colony division in the strategy for varroa control?

Making nucleus colonies and removing the drone brood are two methods that allow beekeepers to delay the treatment with acaricides until the end of summer and avoid a detrimental effect of the mite infestation of the colony. In some cases they allow a reduction of the formic acid treatment in late summer to one single long term treatment in the end of August. These biotechnical procedures present an additional safety measure against small re-invasions occurring occasionally in spring. However, biotechnical measures alone are not sufficient for the control of varroa.

A control strategy by making nucleus-colonies in spring and performing formic acid treatments in late summer has proved efficient for many years in several large apiaries.

Figure 1: Distribution of *varroa mites* in parent colonies and their nucleus-colonies, 1993.

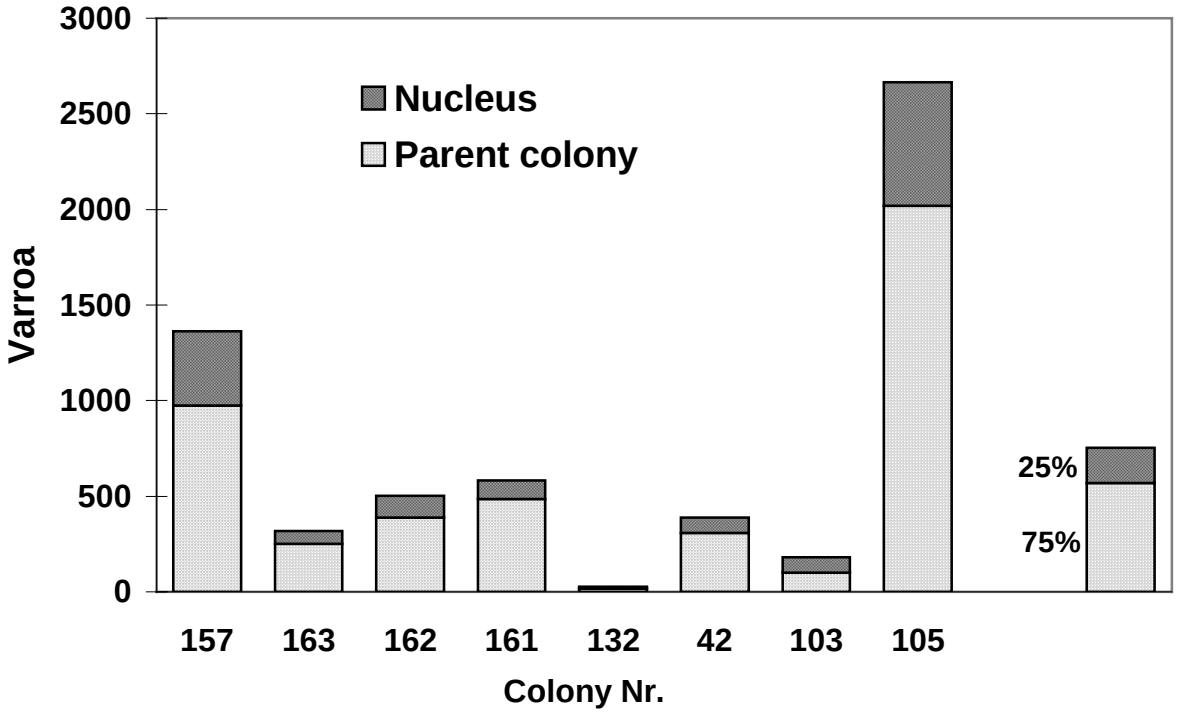
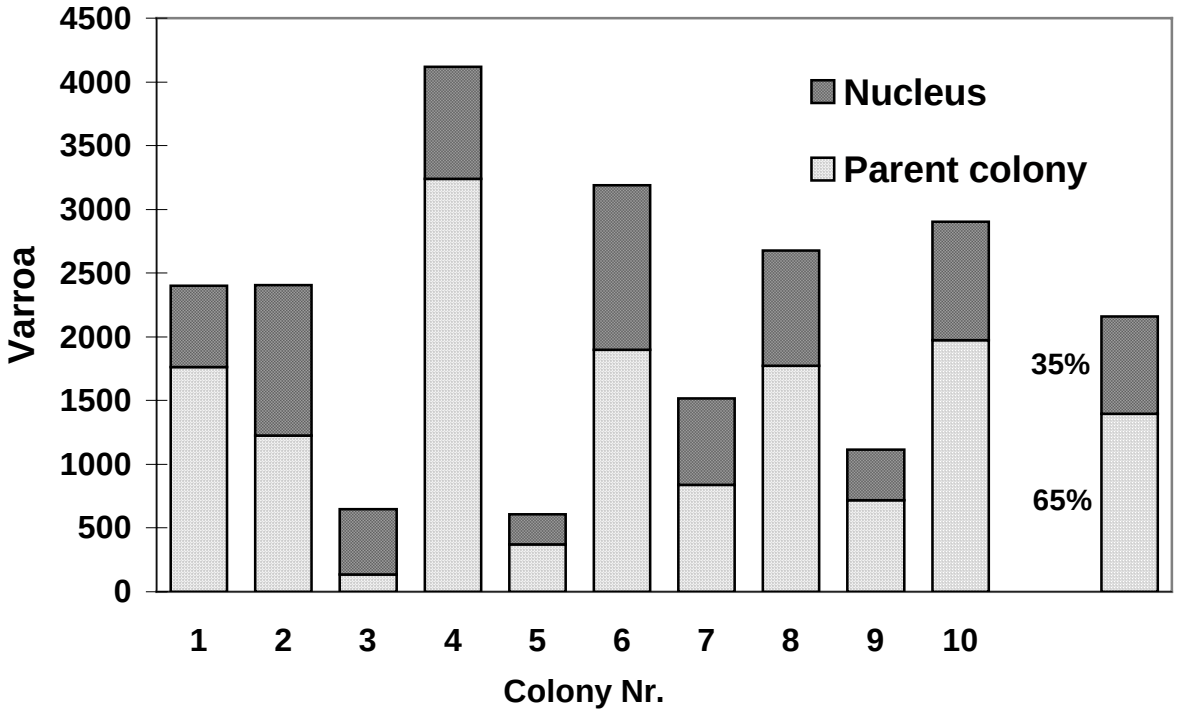


Figure 2: Distribution of *varroa mites* in parent colonies and their nucleus-colonies, 1994.



How to proceed?

The colony division is recommended immediately after the spring nectar flow in the end of May, thus the parent colonies are strong enough in the beginning of July for an eventual honeydew harvest. The queen is left in the parent colony (Imdorf, 1985). This applies to the division carried out before the beginning of the swarm fever. Otherwise, the queen has to be removed together with the nucleus. After the division the nucleus should be placed at a distance of minimum three kilometers from the parent colony.

What are the Benefits for the Beekeeper?

Up-to-date beekeeping requires the regular re-juvenation of the colonies. Certainly, the creation of nucleus-colonies is one of the best ways to do so, being not only an important step in the reduction of the varroa population, but also preventing the swarming of the parent colony. In addition, the nucleus-colonies made this way are used for supplementing the colonies lost during the winter or for strengthening weak colonies in spring, thus facilitating a more abundant spring honey harvest.

Conclusions

- When making a nucleus about one third of the varroa mites in the parent colony are removed.
- The nucleus colonies made in the end of May are strong enough for the wintering and can be used for the re-juvenation of the hive or for strenghthening certain colonies.
- The harvest potential of the parent colony in July is preserved provided that the colony division was carried out in the end of May and that the queen was not removed.

Translation by Barbara Bogdanov.

After Charrière J. D., Maquelin C., Imdorf A., Bachofen B. (1998) Welcher Anteil der *Varroapopulation* wird durch die Bildung eines Ablegers entfernt? *Schweiz. Bienenztg. 121 (8) 507-509.*

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